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ABSTRACT

The characteristics of clinical problem solving tasks are discussed and applied to reading diagnosis and remediation. These characteristics are: (1) clinical practice is concerned with action directed toward a particular problem or set of problems, (2) clinicians are generally concerned with the problems of a particular individual, (3) clinical skills are learned by practicing under supervision, (4) clinical problems are solved by collecting information and drawing conclusions. Two major types of clinical models--diagnostic and therapeutic--are distinguished. In the diagnostic mode, the state of the system or person is first determined. The nature of the problem and its causes are identified. Then, a remedy is chosen that is suited for the problem. In the therapeutic mode, the state of the system is identified only to the point where an action can be taken. Confirmation of a suspected problem follows from the treatment. Since the clinical model is problem-initiated and problem-directed, it is appropriate for the work of reading clinicians. However, it may be less useful for the prevention of problems or for dealing with non-problematic educational planning. (MV)

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CHARACTERISTICS OF THE CLINICAL PROBLEM SOLVING MODEL AND ITS RELEVANCE TO EDUCATIONAL RESEARCH

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Much of our knowledge of the properties of the clinical problem solving model comes from studies of physicians and clinical psychologists. This may suggest that the clinical model is essentially a medical model. Reading clinicians might then well wonder whether it is appropriate for the study of their work with reading problems. Certainly questions about the appropriateness of the medical model have been the source of much debate and controversy in psychology, clinical psychology and related fields. It may be useful, then, to begin this paper by pointing out that we distinguish the clinical model from the medical model. To employ a medical model usually means either:

a) that the work being described or at issue is done by physicians, or that it is appropriate that physicians closely supervise this work; or

b) that the problem can be located within the skin of a single person.

"Clinical"as we use it, has neither of these connotations. We are not suggesting that education in general, or that the field of reading in particular, be subordinated to medicine, although it may turn out that some reading problems have a neuropsychological basis. Nor are we suggesting that the problems of teaching and learning can be exclusively located inside the skin of a single learner or teacher, though again this may be the case at times.

As we hope will become clear, not all clinical tasks are done by persons usually identified as clinicians--physicians, dentists, nurses and other health professionals. Clinical tasks, rather partake of a common set of goals and processes, regardless of who is doing them. The aim of this paper is to

elucidate these features and to suggest that they apply too to reading diagnosis and remediation.

1. Clinical practice is concerned with action directed toward a particular problem or set of problems. It is concerned with doing something, not with establishing norms or gaining theoretical knowledge of fundamental scientific principles. Clinicians are concerned with alleviating problems, not simply studying them. Clinicians recognize that norms and principles will be employed to understand important features of a problem, but the aim of clinical work is not to establish these norms or principles.

2. Clinicians are generally concerned with the problems of a particular individual, who may be identified as a patient, a client, or a student in difficulty. They are not ordinarily concerned with large scale interventions directed at populations. While there is clearly a connection between large scale interventions directed at major social problems, such as a possible epidemic of influenza or a high national rate of illiteracy, and work with troubled individuals or social units, the clinical phase begins at the point where a particular individual (or organization) seeking help comes into direct contact with a helping professional.

3. Because the clinical model is a practical one, we speak of people who do clinical work as "practicing". Clinical skills are learned by practicing under supervision. A clinical internship or clinical "practicum" takes the form of supervised contacts with patients or clients or individuals with problems. To go back to the Latin root of our English word, a doctor is a teacher, not necessarily a physician.

4. Clinical problems are solved by collecting information and then combining this information into a conclusion. The method for combining information into a conclusion preferred by most clinicians is informal, intuitive or qualitative. It is not formally stated or quantitative. Clinical practitioners describe clinical judgment as an artistic or intuitive or qualitative process that is not easily or

appropriately quantified. However, what the practitioner describes as intuitive or qualitative can often be represented by a more formal, rigorous approach: Much of the research on clinical judgment has been concerned with this question, but that is a topic for another paper.

Two major types of clinical models may be distinguished, diagnostic and therapeutic.

In the diagnostic mode, the state of the system or person is first determined. The nature of the problem or malfunction and its causes are identified. Then, insofar as is possible, a remedy is chosen that is suited for the problem. The remedy or therapy must take account of or build upon the strength or capabilities within the troubled person or organization. In this mode, the clinical problem solver generally conceives of the selection of action as flowing as a logical necessity from the identification of the problem. Hence, major emphasis is on the proper characterization of the problem.

A four-stage model of medical inquiry that has been developed elsewhere (Elstein, Shulman, Sprafka, et al 1976) describes the diagnostic mode of the clinical model. The inquiry model points out that diagnostic problems are solved by an iterative process of:

Cue acquisition--the process of gathering and collecting data.

Hypothesis generation--the process of generating alternative formulations of the problem.

Cue interpretation--the process of interpreting the evidence collected in the light of these hypotheses.

Hypothesis evaluation or judgment--the process of combining information to reach a diagnostic decision.

Treatment selection easily flows from the last stage.

In the therapeutic mode, the state of the system is identified only to the point where an action can be taken. Confirmation of a suspected problem follows from the treatment. For example, exploratory surgery is often necessary to determine whether abdominal pain is due to appendicitis or to some other cause.

Diagnosis in these cases is made either by the therapy or by response to treatment. The task of the clinician is to determine what action should be taken, not what the underlying state of the system is.

In the language of classical decision analysis, the basic elements of this model are:

States of nature--the different possible states that the system could be in.

Actions that are available to the decision maker--controlled by his own choices.

Outcomes--these are chance or non-controlled results of taking particular actions.

Probabilities--estimates, either subjective or objective, of the likelihood that each listed state of nature is in fact the case, or that each outcome will occur, or of observing a particular sign or symptom in a particular state of nature.

Utilities--assessments of the value of each possible outcome, carefully distinguished from the probability of its occurrence.

Two other clinical activities may be briefly related to these modes, before returning to the main theme. Screening is a diagnostic process directed at detecting a particular problem and is carried out with a relatively small amount of data collection assembled in a focussed routine. The contact with the client is brief unless the problem searched for is suspected, in which case a more extensive diagnostic routine is implemented. Follow-up is the process of observing whether anticipated outcomes have in fact occurred, assessing what changes in the state of nature are brought about by these new outcomes, and re-cycling the process of deciding about action based on this update.

The Diagnostic Mode

Diagnostic practice is partly discretionary and partly routine. This flexibility is one of its strengths. With respect to cue acquisition, the clinician may choose to employ a standardized set of methods to collect information (examples: administer a complete Stanford-Binet and a test of reading comprehension to all children referred) or to adjust data collection methods so as to illuminate particular problems that are either presented in the referral statement or are disclosed as the worker proceeds. In studies of medical diagnostic reasoning, it was found that physicians employ some combination of these two alternatives. A great deal of flexibility in collecting data is thus possible, varying from brief routine screening to intensive evaluation of a particular problem to searching exploration of an entire domain of function to a routine but thorough workup performed on all clients or patients.

Another feature of the clinical model is the flexibility of solutions available. Diagnostic problems are solved by a process of generating and testing hypotheses. Some hypotheses are generated very early in the clinical encounter, using a very limited amount of data compared to what will eventually be collected. Often the referral statement or the first three minutes of conversation with a client are sufficient to establish a small set of working hypotheses. Of course, as the workup proceeds, some early hypotheses may be dropped and new ones formulated, but experienced clinicians are often able to formulate the probable solution to a diagnostic problem as one of these early hypotheses with a surprising degree of accuracy.

Clinical reasoning employs what philosophers of science call the "hypothetico-deductive" method. The clinician asks, "what findings would be observed if a particular hypothesis were true?" and proceeds to administer the tests or to ask the questions needed to answer this question.

This method provides a great deal of flexibility in the problem space constructed by the clinician to search for a solution and thus in the data to be collected. The set of solutions entertained by the clinician is limited by the contents of long-term memory, for clearly one cannot consider, even hypothetically, a condition one has never heard of or knows nothing about. The capacity of working memory is also a limiting factor. Empirical studies of medical reasoning (Elstein et al, 1976) have shown that it is difficult to consider more than four or five hypotheses simultaneously. When that limit is reached, new candidates can be added only when old ones are dropped or (what amounts to the same thing) when an old hypothesis is reformulated into a new one. Subject only to these constraints, the clinician has great flexibility in selecting a set of four or five hypotheses out of the considerably larger number in long-term memory for evaluation in a particular problem.

The clinical model, either in its diagnostic or therapeutic versions, implies that the process of clinical reasoning does not simply end with collecting data and constructing a list of what might be wrong with the patient. The reasoning is completed only when the data have been interpreted in the light of the alternatives to be considered and some judgment about either an action or diagnosis, or both has been made. It may be true that a number of relatively untrained reading specialists cannot really employ the clinical model in its entirety because they lack the skills necessary to carry out the last two stages of the model. In our view, this does not invalidate the model. Rather, it points out deficiencies in the training of reading specialists that should be remedied by improved training programs.

What educationally related activities can be fitted to the clinical model? Reading diagnosis and remediation activities fit beautifully, when these activities are conducted by properly qualified specialists. The reading specialist works with individual learners who have been referred for problems. The specialist's task is to identify and specify the nature of the problem and then to select an appropriate remedy. The individual one-on-one character of these interactions and the cycle of data collection--hypothesis generation--cue interpretation--hypothesis verification that reading clinicians execute exemplify the clinical model.

In this discussion, we have pointed out that the clinical model is problem-initiated and problem-directed. That is why it is so well suited to the study of reading clinicians. But that must imply that it is less well suited for other purposes. It is less clear that the activities of classroom teachers planning reading activities for a week or more fit this model. Ironically, the degree to which the model is suited for intervention in problems may make it less useful for prevention of problems or for dealing with non-problematic educational planning. Medicine, too, faces this dilemma, as it moves from concern with disease to concern with health maintenance and prevention of disease. At least one study has already been published showing that the routine physical examination in the absence of a presenting problem is not cost-effective. One purpose of the research on reading as a clinical activity conducted by the Institute for Research on Teaching is to identify the extent to which this model can be usefully used to understand educational activities. We do not claim that it is a universal model for all educational activity, but we do believe that it fits and helps us to understand those educational programs directed at identifying and remedying learning deficiencies, and that is a sufficient objective.

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